WHAT IS CLAIMED IS:

1. A method of carrying out multiplex transmission of a subscriber service signal, comprising the steps of:

(a) converting a subscriber service signal including x digital subscriber line (xDSL) signals, from an analog form to a digital form;

(b) storing a plurality of thus converted sampling digital signals and control signals into a first multiple signal, and multiplexing in time-sharing a plurality of the thus produced first multiple signals to thereby produce a second multiple signal; and

(c) transmitting said second multiple signal.

2. The method as set forth in claim 1, further comprising the step (d) encoding said second multiple signal, said step (d) being to be carried out between said steps (b) and (c).

3. The method as set forth in claim 1, wherein said first multiple signal is encoded in said step (b) before being multiplexed in time-sharing.

4. The method as set forth in claim 1, wherein said first multiple signal has a frame structure including frames arranged in a certain cycle, and wherein a sampling digital signal of each of subscribers is assigned a time slot at a predetermined position in said frame, and is always stored in the assigned time slot.

5. The method as set forth in claim 1, wherein said first multiple signal is comprised of a packet comprised of a header and a pay-load, and a sampling digital signal of each of subscribers is stored into said pay-load in a predetermined order.

6. The method as set forth in claim 4, wherein said first multiple signal is comprised of either a frame comprised of an overhead and a pay-load or a packet comprised of a header and a pay-load, and said control signal is stored into a vacancy in said overhead or said header.

7. The method as set forth in claim 4, wherein said first multiple signal is comprised of either a frame comprised of an overhead and a pay-load or a packet comprised of a header and a pay-load, said control signal is stored together with said sampling digital signal into said pay-load, and said control signal is periodically inserted into said sampling digital signal in said pay-load.

8. The method as set forth in claim 5, wherein said first multiple signal is comprised of either a frame comprised of an overhead and a pay-load or a packet comprised of a header and a pay-load, said control signal is stored together with said sampling digital signal into said pay-load, and said control signal is periodically inserted into said sampling digital signal in said pay-load.

9. The method as set forth in claim 4, wherein said first multiple signal is comprised of either a frame comprised of an overhead and a pay-load or a packet comprised of a header and a pay-load, said control signal is stored together with said sampling digital signal into said pay-load, and said control signal is stored in said pay-load into successive areas separated from said sampling digital signal.

10. The method as set forth in claim 5, wherein said first multiple signal is comprised of either a frame comprised of an overhead and a pay-load or a packet comprised of a header and a pay-load, said control signal is stored together with said sampling digital signal into said pay-load, and said control signal is stored in said pay-load into successive areas separated from said sampling digital signal.

11. The method as set forth in claim 4, wherein said first multiple signal is comprised of either a frame comprised of an overhead and a pay-load or a packet comprised of a header and a pay-load, said control signal is stored together with said sampling digital signal into said pay-load, and each bit in said control signal is added to a bit in said sampling digital signal and is stored into said pay-load.

12. The method as set forth in claim 5, wherein said first multiple signal is comprised of either a frame comprised of an overhead and a pay-load or a packet comprised of a header and a pay-load, said control signal is stored together with said sampling digital signal into said pay-load, and each bit in said control signal is added to a bit in said sampling digital signal and is stored into said pay-load.

13. The method as set forth in claim 4, wherein said first multiple signal has the same transmission rate as a transmission rate of STM-1 or STM-4 in synchronous digital hierarchy (SDH).

14. The method as set forth in claim 4, wherein said first multiple signal uses a frame having a cycle of 125 μ s.

15. The method as set forth in claim 4, wherein said first multiple signal uses A1 byte (1111011) and A2 byte (00101000) used in synchronous digital hierarchy (SDH), as a frame heading byte.

16. The method as set forth in claim 4, wherein said first multiple signal has a frame having the same structure as a structure of STM-1 or STM-4 in synchronous digital hierarchy (SDH), and said sampling digital signal and said control signal are stored into a pay-load in said frame.

17. The method as set forth in claim 4, wherein said subscriber service signal is A/D converted at a sampling rate of 8.832, 4.416 or 2.208 mega-sample/second (MS/s), and at a bit solution of 10, 11 or 12 bits.

18. The method as set forth in claim 5, wherein said first multiple signal is transmitted at 100 Mb/s, 125 Mb/s, 1Gb/s or 1.25 Gb/s.

19. The method as set forth in claim 5, wherein said first multiple signal uses an Ether packet defined in IEEE 802.3 LAN.

20. The method as set forth in claim 5, wherein said subscriber service signal is A/D converted at a sampling rate of 8.832, 4.416 or 2.208 mega-sample/second (MS/s), and at a bit solution of 10, 11 or 12 bits.

21. The method as set forth in claim 5, wherein said second multiple signal has the same transmission rate as a transmission rate of STM-m in synchronous digital hierarchy (SDH) wherein m is an integer equal to or greater than 1.

22. The method as set forth in claim 1, wherein said second multiple signal uses a frame having a cycle of 125 μ s.

23. The method as set forth in claim 1, wherein said second multiple signal uses A1 byte (1111011) and A2 byte (00101000) used in synchronous digital hierarchy (SDH), as a frame heading byte.

24. The method as set forth in claim 1, wherein said second multiple signal is based on synchronous digital hierarchy (SDH), and further comprising the step of storing said first multiple signal based on synchronous digital hierarchy (SDH).

25. The method as set forth in claim 1, wherein said second multiple signal is produced by bit-multiplexing or byte-multiplexing a plurality of said first multiple signals in time-sharing, and further comprising the step of inserting an identifier into at least one of said first multiple signals in order to identify each of said first multiple signals.

26. The method as set forth in claim 1, wherein said second multiple signal is produced by bit-multiplexing or byte-multiplexing a plurality of said first multiple signals in time-sharing, and further comprising the step of inverting at least a part of frame synchronization byte of said first multiple signals in order to identify each of said first multiple signals.

27. The method as set forth in claim 1, wherein said second multiple signal is transmitted at 1Gb/s, 1.25 Gb/s, 10 Gb/s or 12.5 Gb/s.

28. The method as set forth in claim 1, wherein said second multiple signal is produced by bit-multiplexing or byte-multiplexing said first multiple signal in time-sharing, and further comprising the step of inserting an identifier, in place of NULL indicative of no signal status, into at least one of said first multiple signals in order to identify each of said first multiple signals.

29. A method of carrying out multiplex transmission of a subscriber service signal, comprising the steps of:

(a) converting a subscriber service signal including x digital subscriber line (xDSL) signals, from an analog form to a digital form;

(b) storing a plurality of thus converted sampling digital signals and control signals into a first multiple signal; and

(c) transmitting said first multiple signals.

30. The method as set forth in claim 29, wherein said first multiple signals are encoded before transmitted in step (c).

31. The method as set forth in claim 29, wherein said first multiple signal has the same transmission rate as a transmission rate of STM-m in synchronous digital hierarchy (SDH) wherein m is an integer equal to or greater than 1, and includes A1 byte (1111011) and A2 byte (00101000) both having a cycle of 125 μ s, at a head of a frame.

32. The method as set forth in claim 29, wherein said first multiple signal uses a frame of STM-m in synchronous digital hierarchy (SDH) wherein m is an integer equal to or greater than 1.

33. The method as set forth in claim 29, wherein said first multiple signal uses an Ether packet defined in IEEE 802.3 LAN.

34. The method as set forth in claim 29, wherein said first multiple signal is transmitted at 1Gb/s, 1.25 Gb/s, 10 Gb/s or 12.5 Gb/s.

35. A method of carrying out multiplex transmission of a subscriber service signal, comprising the steps of:

(a) converting a subscriber service signal including x digital subscriber line (xDSL) signals terminated by an xDSL modem unit, from an analog form to a digital form;

(b) multiplexing a plurality of thus converted sampling digital signals and control signals; and

(c) transmitting said signals,

said subscriber service signal being converted from an analog form to a digital form at a first sampling rate,

a ratio between said first sampling rate and a sampling rate of said xDSL modem unit being equal to an integer.

36. The method as set forth in claim 35, wherein said first sampling rate is equal to 1.104 MS/s multiplied by an integer.